



Exoplanet Exploration Program Overview

Presented to the
Exoplanet Exploration Program Analysis Group
(ExoPAG)

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Dr. Douglas M. Hudgins

Exoplanet Exploration Program Scientist
Astrophysics Division
Science Mission Directorate
NASA Headquarters

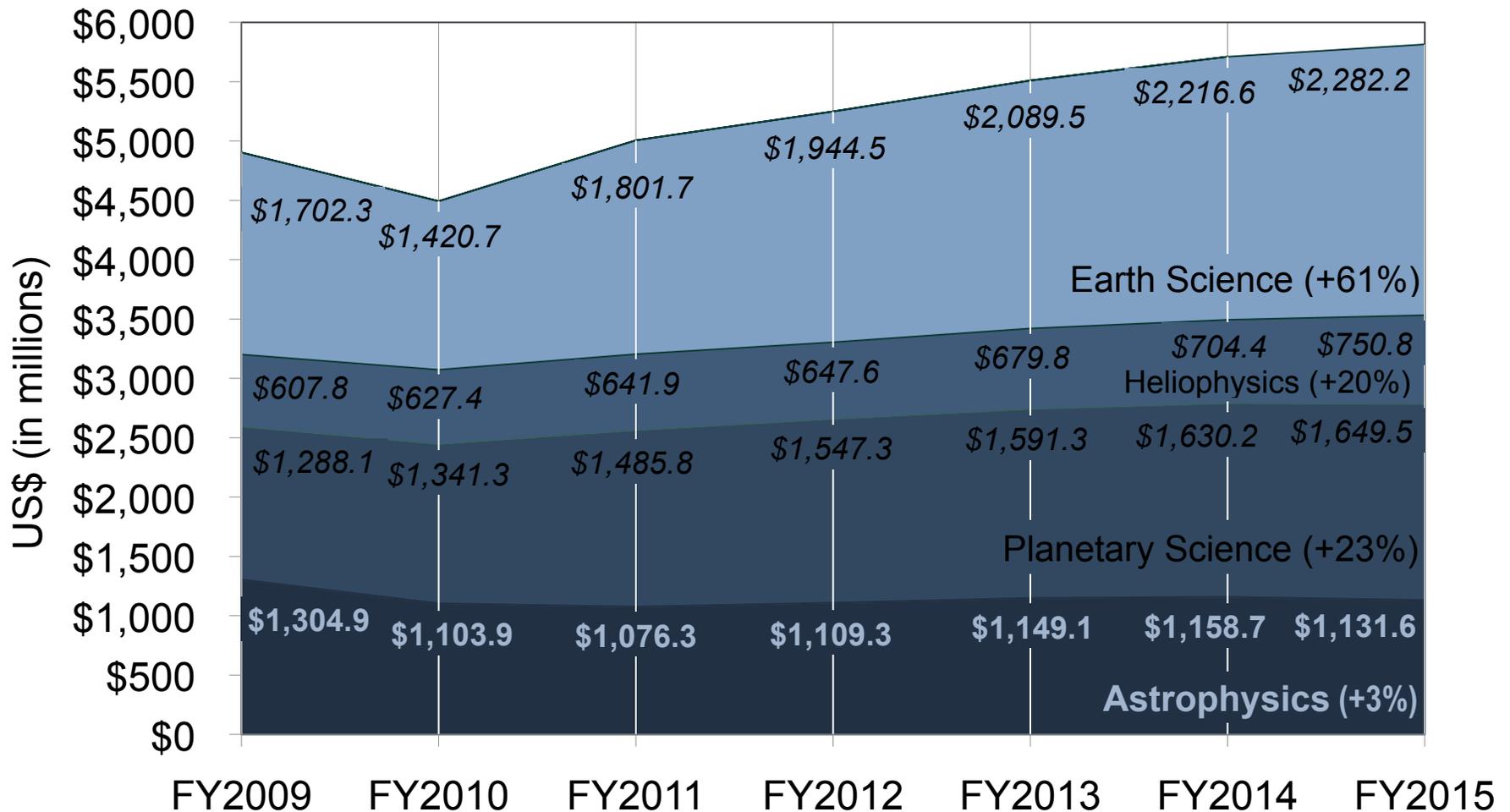


NASA Science Mission Directorate

Budget Profile 2009 – 2015 *(President's FY11 Budget Request)*

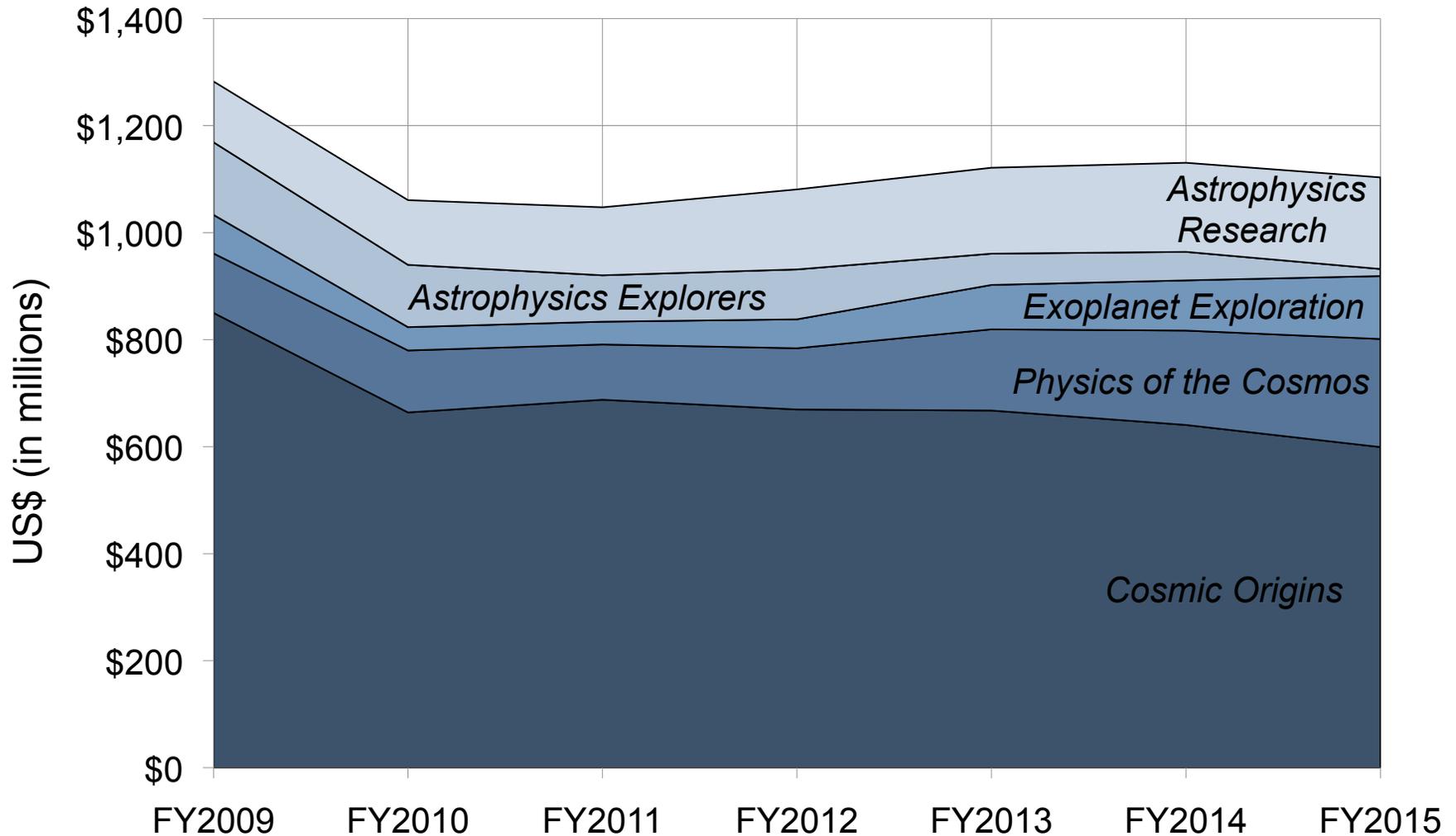
NASA Science Mission Directorate (+29%)

\$4,903.1 \$4,493.3 \$5,005.7 \$5,248.7 \$5,509.7 \$5,709.9 \$5,814.1



NASA Astrophysics Division

Budget Profile 2009 – 2015 *(President's FY11 Budget Request)*

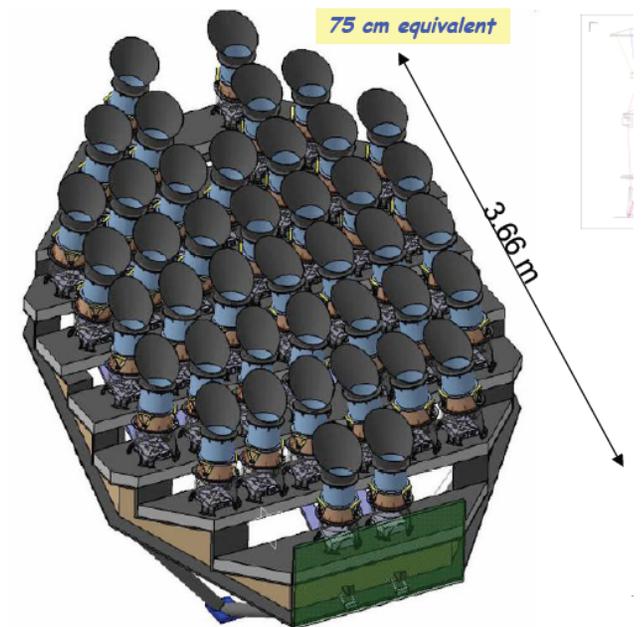


Astro 2010 Decadal Survey Report

Insert recommendations here

ESA's PLATO Mission

- PLATO = PLAnetary Transits and Oscillations of stars
- One of three M-Class Cosmic Visions missions under consideration by ESA (Euclid, Solar Orbiter)
- Down-select to two missions anticipated November 2011 for launches in 2017, 2018.
- Currently laying groundwork for possible US participation, if consistent with recommendations of Decadal Survey
- Objective: Detect and characterize planetary systems, particularly earth-like in habitable zone
- Techniques: High-precision Photometry, detection by transits, asteroseismology, ground based spectroscopy
- Instrument: Multiple telescopes surveying a very wide field of view
- Observing strategy: 2 long runs (2-3 years) + several short runs



Science Goals of PLATO

- The primary goal of PLATO is to provide a full statistical analysis of exoplanetary systems around stars that are bright and nearby enough to allow for simultaneous and/or later detailed studies of their host stars.
 - *1,000-3,000 very bright stars (<8 mag) for exoplanets with spectroscopic follow-up*
 - *20,000 stars (<11 mag) for planets and asteroseismology (2% mass, 10% ages)*
 - *250,000 stars at lower sensitivity for exoplanets (<12 mag)*
- As a secondary objective, PLATO will also perform seismic analysis for a very large sample of stars all across the HR diagram, also without detected exoplanetary systems.
- Long (2 and 3 yr) survey of 5,700 sq. deg. includes many more bright stars than Kepler for exoplanets plus asteroseismology characterization of host stars
- Step & stare survey >16,000 sq. deg (40% of sky, or more with longer mission) to identify planets around nearest, brightest stars suitable for spectroscopic follow-up (2-6 months per field)

Possible NASA Collaboration/PLATO Mission

- Total U.S. contribution to mission ~20% of the total mission value to ESA
 - *NASA is participating in Definition Phase studies with ESA to identify potential contributions to the scientific payloads*
 - *Additional potential contributions (e.g. spacecraft hardware, ground segment contrib., launch segment contrib., etc.) also to be defined during the Definition Phase*
 - *Data processing and calibration activities count toward the U.S. contribution*
 - *Funding to selected scientific participants for data exploitation (i.e., science data analysis, interpretation) does not count toward the U.S. contribution*
- Possible U.S. participation through member states proposing to the ESA AO will count toward the total U.S. contribution
- NASA will appoint proportionate representation to the Euclid and PLATO mission-level science teams
- All data will eventually be archived and made accessible for further scientific exploitation by the broader scientific community

Possible NASA Collaboration/PLATO Mission

U.S. Contributions to PLATO in Three Categories

- Scientific investigations and payload/instrumentation contributions competitively selected through an open NASA-sponsored AO shortly after the release of the decadal survey
- Non-payload space vehicle/mission components, such as spacecraft subsystems or ground/launch segment contributions, to be provided by the appropriate NASA program
- Additional U.S. scientific or institutional contributions (not funded by NASA) to European-led proposals selected via the ESA AO process.

U.S. Participation in Mission Optimization Studies

- Two US scientists assigned to study team to guide concept development and ensure consistency with mission science goals.
- US Engineering support to guide concept development and identify niches for NASA contributed hardware and ground support.
- NASA will receive the Astro 2010 decadal survey recommendations before committing to providing contributions to PLATO mission.
- JDEM, SIM, and other scientifically related efforts will continue with FY2010 activities as planned.

Kepler Mission Update

